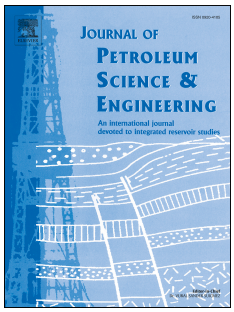
Accepted Manuscript



Pressure transient behaviors of hydraulically fractured horizontal shale-gas wells by using dual-porosity and dual-permeability model

Daolun Li, John Yilin Wang, Wenshu Zha, Detang Lu

PII: S0920-4105(16)30755-0

DOI: 10.1016/j.petrol.2018.01.016

Reference: PETROL 4603

To appear in: *Journal of Petroleum Science and Engineering*

Received Date: 23 October 2016

Revised Date: 4 December 2017

Accepted Date: 8 January 2018

Please cite this article as: Li, D., Wang, J.Y., Zha, W., Lu, D., Pressure transient behaviors of hydraulically fractured horizontal shale-gas wells by using dual-porosity and dual-permeability model, *Journal of Petroleum Science and Engineering* (2018), doi: 10.1016/j.petrol.2018.01.016.

Pressure Transient Behaviors of Hydraulically Fractured Horizontal Shale-gas Wells by Using Dual-Porosity and Dual-Permeability Model

Daolun Li*, Hefei University of Technology, Penn State University; John Yilin Wang, Pennsylvania State University; Wenshu Zha, Hefei University of Technology; Detang Lu, University of Science and Technology of China

*Correspondence to Daolun LI. Email: LdaoL@ustc.edu.cn

Abstract: A dual-porosity and dual-permeability (DPDP) model was developed to describe the fluids flow and transient pressure behaviors of multistage hydraulically fractured horizontal wells in shale-gas reservoirs by incorporating gas adsorption and gas permeability corrections. This 3-dimensional, 1-phase numerical model was developed using finite volume method and solved implicitly with unstructured PEBI (Perpendicular Bisection) gridding. Parametric studies were conducted to understand the pressure transient behaviors with effects of gas adsorption, permeability correction, transmissibility between fracture and matrix system (called inter-porosity flow ability, IPF), and natural fracture spacing. The results showed that pressure transient behaviors were not only controlled by the individual ultimate adsorption capacity (UAC) and IPF but rather the combination of IPF ability and UAC derived herein. The physics was that for a block by omitting the flow in matrix systems and accumulation term, the flow rate of free gas between the matrix cell and the fracture cell was equal to the flow rate caused by adsorbed or desorbed due to a pressure change in the matrix cell. This was the reason that if the IPF ability